

**Melvin S. Finstein, Ph.D.**  
**Professor Emeritus, Rutgers University**  
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### **Education**

Ph.D., University of California, Berkeley, 1965  
M.S., Cornell University, 1961  
B.S., Soil Science, Cornell University, 1959  
AAS, Long Island Agricultural and Technical Institute, 1953  
High School: Cambridge (Massachusetts) High and Latin School, 1949

### **Academic Positions, Rutgers University, Department of Environmental Sciences, New Brunswick, N.J.**

Professor Emeritus (retired 1999) - present  
Professor 1972-1999  
Associate Professor 1968-1972  
Assistant Professor 1965-1968

### **Courses taught**

Pollution Microbiology  
Pollution Microbiology Laboratory  
Solid Waste Management and Research  
Advanced seminars and field trips

### **Research Specialties**

Nitrification in Rivers and Sewage Treatment Plants  
Composting as a Controlled Microbial Ecosystem  
Anaerobic Digestion (methanogenesis) for Municipal Solid Waste  
Biofilter Technology  
Applications to Extraterrestrial Habitats  
Bridging the Gap Between Science and Solid Waste Practice

### **Military Service**

United States Army, 1954-1956 (Honorable Discharge)

### **Selected Activities**

Associated with the Induce Blanket Reactor Process (IBR) 19 May 2009 - present  
Associated with Arrow Ecology Ltd. (ArrowBio Process) March 2001 – 19 May 2009  
Guest lectures on solid waste, Israel Institute of Technology, Haifa  
Sabbatical leave performing research for NASA: November 1997-August 1998  
at Kennedy Space Center, Florida  
International Standards Organization Committee (methodology for nitrifying bacteria and

Salmonellae)  
American Society for Microbiology (curriculum development – microbiology course for engineers)  
Instructor UNESCO/UNEP/WHO (University of the Philippines)  
National Academy of Sciences (seminar series, Tunisia, North Africa)

**Reviewer for**

*Journal of Water Pollution Control Federation*  
*Applied and Environmental Microbiology*  
*Canadian Journal of Microbiology*  
*Waste Management & Research*  
*BioDegradation*  
US/Israel Bi-National Research Foundation  
National Science Foundation  
U.S. Environmental Protection Agency  
U.S. Department of Agriculture  
and other journals and agencies.

**Special advisor or consultant on pollution and solid waste problems**

Watershed Agricultural Council of the New York City Watersheds  
Chicago Wastewater Reclamation District  
Sussex County, NJ  
Ocean County, NJ  
Morris County, NJ  
Stevens and Lee (law firm), Reading, PA.  
1<sup>st</sup> Judicial District of West Virginia (as Friend of the Court)

**Publications**

Three critical reviews of the literature on biological process control  
Critical review of URS Corporation reports to Los Angeles (unpublished)  
Laboratory manual “Pollution Microbiology”  
Over 50 scientific/technical papers, mostly in peer reviewed journals

**Selected Publications:**

Finstein, M.S. and Y. Zadik. November 2008. Integrated Materials and Energy Recovery from Municipal MSW. *BioCycle*, p. 52-53.

Finstein, M.S. 2006. ArrowBio Process Integrates Preprocessing and Advanced Anaerobic Digestion to Recover Recyclables and Generate Energy. Proc. SWANA 11<sup>th</sup> Annual Symposium 05-08 Nashville, Tennessee.

Finstein, M.S, Y. Zadik, D. Brody, and A. Marshal. 2004. The ArrowBio Process for Mixed Municipal Solid Waste – Responses to “Requests for Information,” p. 407-413. Proc. 1<sup>st</sup> UK Conference and Exhibition on: Biodegradable and Residual Waste Management. (Edited by E.K. Papadimitriou and E.I. Stentiford), February 18 and 19, 2004, Harrogate, UK.

Finstein, M.S. 2004. Protecting Watersheds from *Cryptosporidium* in Manure: A Literature Review. *Jour. Amer. Water Works Association* **96**: 114-116 (Expanded Summary – the full article is available online at <[www.awwa.org](http://www.awwa.org)>).

Finstein, M.S. 2003. Operational Full-Scale ArrowBio Plant Integrates Separation and Anaerobic Digestion in Watery Processing, with Near-Zero Landfilling. Proc. WasteCon 2003 (SWANA’s 41<sup>st</sup> Intern Meeting, St. Louis, Missouri, 14-16 October 2003), p. 290-296.

Strom, P.F. and M.S Finstein. 2000. Leaf Composting. In, *Urban and Community Forestry in the Northeast*, J.E. Kuser (ed), Plenum Press, New York.

Finstein, M.S, P.F. Strom, J.A. Hogan, and R.M.Cowan. 1999. Composting on Mars or the Moon: I. Comparative Evaluation of Process Design Alternatives. *Life Support & Biosphere Science* **6**:169-179.

Finstein, M.S., J.A. Hogan, J.C. Sager, R.M. Cowan, and P.F. Strom. 1999. Composting on Mars or the Moon: II. Compatibility of Top-wise Introduction of Waste and Air with Temperature Feedback Control. *Life Support & Biosphere Science* **6**:181-191.

Finstein, M.S. 1999. Lack of Yard Waste Composting in Wheeling, West Virginia, in The Context of Statewide Legislation and Regulation. *The Highlands Voice*, p.12-13, October 1999.

Finstein, M.S. 1998. Realistic Scale Composting Reactor for Martian or Lunar Habitat: Generations I and II. Report to NASA/ASEE Summer Faculty Fellowship Program, at Kennedy Space Center, FL.

Hogan, J.A., R.M. Cowan, J. Joshi, P.F. Strom and M.S. Finstein. 1998. On the Development of Advanced Life Support Systems Maximally Reliant on Biological Systems. SAE Technical Paper Series 981535.

Tambwekar, J.A., R.M. Cowan, J. Joshi, P.F. Strom and M.S. Finstein. 1998. Removal of Trace Concentrations of Ethylene from Air by Biofiltration: Preliminary Results. SAE Technical Paper Series 981614.

Joshi, J.A., R.M. Cowan, J. Joshi, P.F. Strom and M.S. Finstein. Gaseous Ammonia Removal in Biofilters: Effect of Biofilter Media on Products of Nitrification. SAE Technical Paper Series 981613.

Strom, P.F. and M.S. Finstein. 1997. Book Review -- Environmental Science and Engineering. *BioScience* **47**:258-259.

Finstein, M.S. 1993. What You Need to Know About the Science and Technology of Composting to Write an Effective Request for Proposal (RFP). *Composting Frontiers*, Summer 1993.

Finstein, M.S. 1993. Guide to Matching Composting technology to Circumstances. *Composting Frontiers*, Winter, 1993.

Finstein, M.S. and J.A. Hogan. 1993. Integration of Composting Process Microbiology, Facility Structure, and Decision-making. In, *Science and Engineering of Composting: Design, Environmental, Microbiological and Utilization Aspects* (editors: H.A.J. Hoitink and H.M. Keener), p.1-23. Renaissance Publ., Worthington, Ohio.

Finstein, M.S. 1993. Book Review -- Microbes and Man (John Postgate. Cambridge University Press). *Soil Science* **155**:360-361.

Finstein, M.S. 1992. Composting in the Context of Municipal Solid Waste Management. In, *Environmental Microbiology* (editor, R. Mitchell), p.355-374, Wiley-Liss, New York.

Hogan, J.A. and M.S. Finstein. 1991. Composting of Solid Waste During Extended Human Travel and Habitation in Space. *Waste Management & Research* **9**:453-463.

Finstein, M.S., J.V. Hunter and J.A. Hogan. 1990. Treatment of Industrial Organic Solid Wastes Through composting. Final Report BICM-9. Hazardous Substance Management Research Center, New Jersey Institute of Technology.

Finstein, M.S. 1989. Book Review -- Biology of Anaerobic Microorganisms. *Quarterly Review of Biology* **64**:495-496.

Finstein, M.S. 1989. Activities on Composting as a Waste Treatment Technology at the Department of Environmental Science, Rutgers University. *Waste Management & Research* **7**:291-294.

Finstein, M.S. 1989. Composting Solid Waste: Costly Mismanagement of a Microbial Ecosystem. *ASM News* **55**:599-602.

Hogan, J.A., Miller, F.C. and M.S. Finstein. 1989. Physical Modeling of the Composting Ecosystem. *Applied and Environmental Microbiology* **55**:1082-1092.

Finstein, M.S., F.C. Miller, J.A. Hogan and P.F. Strom. 1988. EPA Guidance - Authors' Response. *BioCycle* **29(2)**:60-61.

Finstein, M.S., F.C. Miller, J.A. Hogan and P.F. Strom. 1987. Analysis of EPA Guidance on Composting Sludge. Part I. Biological Heat Generation and Temperature. *BioCycle* **28(1)**:20-26.

Finstein, M.S., F.C. Miller, J.A. Hogan and P.F. Strom. 1987. Analysis of EPA Guidance on Composting Sludge. Part II. Biological Process Control. *BioCycle* **28(2)**:42-47.

Finstein, M.S., F.C. Miller, J.A. Hogan and P.F. Strom. 1987. Analysis of EPA Guidance on Composting Sludge. Part III. Oxygen, Moisture, Odor, Pathogens. *BioCycle* **28(3)**:38-44.

Finstein, M.S., F.C. Miller, J.A. Hogan and P.F. Strom. 1987. Analysis of EPA Guidance on Composting Sludge. Part IV. Facility Design and Operation. *BioCycle* **28(4)**:56-61.

Finstein, M.S., F.C. Miller and P.F. Strom. 1986. Waste Treatment Composting as a Controlled System. Chapter 10, p.363-398, in *Biotechnology* Vol. 8. Microbial Degradations (series editor, H.-J. Rehm and G. Reed) VCH Verlagsgesellschaft (German Chemical Society), Weinheim, Germany.

Finstein, M.S., F.C. Miller and P.F. Strom. 1986. Monitoring and Evaluating Composting Process Performance. *J. Water Pollut. Control Fed.* **58**:272-278.

Finstein, M.S. and F.C. Miller. 1985. Principles of Composting Leading to Maximization of Decomposition Rate, Odor Control and Cost Effectiveness. In, *Composting of Agricultural and Other Wastes* (editor, J.K.R. Gasser), p.13-26, Elsevier Appl. Science, London and New York.

Miller, F.C. and M.S. Finstein. 1985. Economic and Technical Analysis of Drying Sludge Through Composting and Air Drying. In, *Proc. 17th Mid-Atlantic Conf. Indust. Waste Treatment* (editor, I.J. Kugelman), p.509-522, Technomic, Lancaster, PA and Basel.

Miller, F.C. and M.S. Finstein. 1985. Materials Balance in the Composting of Sewage Sludge as Affected by Process Control Strategy. *J. Water Pollut. Control Fed.* **57**:122-127.

Finstein, M.S., MacGregor, S.T., Miller, F.C. and Psarianos, K.M. 1985. The Rutgers Strategy for Composting: Process Design and Control. EPA/600/2-85/059, MERL-CI-2146. (U.S. Dept. Commerce, National Technical Information Service, Springfield, VA 22161, Accession No. PB85 207538/AS.)

Strom, P.F. and M.S. Finstein. 1985. Leaf Composting Manual for New Jersey Municipalities. Department of Environmental Science, Rutgers University/New Jersey Department of Environmental Protection, Trenton.

Psarianos, K.M., S.T. MacGregor, F.C. Miller, and M.S. Finstein. 1983. Design of Composting Ventilation System for Uniform Air Distribution. *BioCycle* **24(2)**:27-31.

Miller, F.C., S.T. MacGregor, K.M. Psarianos and M.S. Finstein. 1983. A Composting Processing Failure: Diagnosis and Remedy. In, Proc. 15th Mid-Atlantic Conf. Indust. Waste Treatment, p.463-471, Ann Arbor, Science

Finstein, M.S. 1983. Economic Motive for Managing the Composting Ecosystem. *Bio/Technology* 1:341-342.

Finstein, M.S., F.C. Miller, P.F. Strom, S.T. MacGregor and K.M. Psarianos. 1983. Management of the Composting Microbial Ecosystem for Waste Treatment. *Bio/Technology* 1:347-353.

Finstein, M.S. F.C. Miller and P.F. Strom, 1983. Evaluation of Composting Process Performance. In, *Composting Solid Waste and Slurries* (editor, E.I. Stentiford), p.23-34, The University of Leeds, England.

Strom, P.F., F.C. Miller and M.S. Finstein. 1983. Problem of Scale in Composting Research. In, *Composting Solid Waste and Slurries* (editor, E.I. Stentiford), p.35-41, The University of Leeds, England.

Miller, F.C. and M.S. Finstein. 1983. Equipment for Control and Monitoring of High Rate Composting. In, *Intern. Symp. Biol. Reclamation Land Utilization Urban Wastes* (edotors, F. Zucconi, M. de Bertoldi, E.S. Cappola), 551-560. The University of Naples.

Miller, F.C., S.T. MacGregor, K.M. Psarianos, J. Cirello and M.S. Finstein. 1982. Direction of Ventilation in Composting Sewage Sludge. *J. Water Pollut. Control Fed.* 54:111-113.

Finstein, M.S., F.C. Miller, S.T. MacGregor and K.M. Psarianos. 1982. Rational Design and Control of Composting Facilities. In, *Proc. National Conf. Energy Conservation: Retrofit of Municipal Wastewater Treatment Facilities*, p.19-25, June 15-23, 1981, Los Angeles, CA. Sponsored by: U.S. Department of Energy. ANL/CNSV-TM-95. U.S. Dept. Commerce National Technical Information Service, Springfield, VA. 22161.)

Miller, F.C., S.T. MacGregor, K.M. Psarianos and M.S. Finstein. 1982. Static-Pile Sludge Composting with Recycled Compost as the Bulking Agent. In, *Proc. 14th Mid-Atlantic Conf. Indust. Waste Treatment*, p.34-45, Ann Arbor, Science

Finstein, M.S., F.C. Miller, S.T. MacGregor and K.M. Psarianos. 1982. Composting Sludge: A Means of Linking Decomposition and Dewatering. In, *Proc. 6th Mid-America Conf. Environ. Engineering Design*, p.112-119, Kansas City, MO., University Missouri-Columbia.

Finstein, M.S., and F.C. Miller. 1982. Distinction Between Composting (the Process) and Compost (the Product). Letter -- *BioCycle* 23(6):54.

MacGregor, S.T., F.C. Miller, K.M. Psarianos and M.S. Finstein. 1981. Composting Process Control Based on Interaction Between Microbial Heat Output and Temperature. *Appl. Environ. Microbiol.* **41**:1321-1330.

Finstein, M.S., Karen Wei-Lin and G. Fishler. 1981. Sludge Composting and Utilization: Review of the Literature on Temperature Inactivation of Viruses, *Ascaris lumbricoides* eggs, and *Aspergillus fumigatus*. Final report to USEPA, NJDEP, CCMUA.

Hunter, J.V., M.S. Finstein, D.J. Suler and R.R. Bobal. 1981. Sludge Composting and Utilization: Fate of Concentrated Industrial Waste During Laboratory Scale Composting of Sewage Sludge. Final report to USEPA, NJDEP, CCMUA.

Finstein, M.S., J. Cirello, S.T. MacGregor, F.C. Miller, D.J. Suler and P.F. Strom. 1980. Discussion of "Engineering Principles of Sludge Composting" (by R.T. Haug. 1979. *J. Water Pollut. Control Fed.* **51**:2189-2206.) *J. Water Pollut. Control Fed.* **52**:2037-2040.

Finstein, M.S. 1980. Composting Microbial Ecosystem: Implications for Process Design and Control. *Compost Sci.* **21(4)**:25-36.

Finstein, M.S., M.L. Morris, J. Cirello, D.J. Suler and P.F. Strom. 1980. Microbial Ecosystems Responsible for Anaerobic Digestion and Composting. *J. Water Pollut. Control Fed.* **52**:2675-2685.

Strom, P.F., M.L. Morris and M.S. Finstein. 1980. Leaf Composting through Appropriate, Low-Level, Technology. *Compost Sci.* **21(6)**:44-48.

Finstein, M.S., J. Cirello, S.T. MacGregor, F.C. Miller and K.M. Psarianos. 1980. Sludge Composting and Utilization: Rational Approach to Process Control. Final report to USEPA, NJDEP, CCMUA. (U.S. Dept. Commerce, National Technical Information Service, Springfield, VA. 22161, Accession No. PB82-136243.)

Cirello, J., R.A. Rappaport, P.F. Strom, V.A. Matulewich, M.L. Morris, S. Goetz and M.S. Finstein. 1979. The question of Nitrification in the Passaic River, N.J.: Analysis of Historical Data and Experimental Investigation. *Water Research* **13**:525-537.

Finstein, M.S. and M.L. Morris. 1979. Anaerobic Digestion and Composting: Microbiological Alternatives for Sewage Sludge Treatment. *ASM News* **45**:44-48.

Matulewich, V.A. and M.S. Finstein. 1978. Distribution of Autotrophic Nitrifying Bacteria in a Polluted River (the Passaic). *Appl. Environ. Microbiol.* **35**:67-71.

Finstein, M.S., P.F. Strom and V.A. Matulewich. 1978. Discussion of "Significance of Nitrification in Stream Analysis-Effects on the Oxygen Balance" (by R.J. Courchaine. 1968. *J. Water Pollut. Control Fed.* **40**:835-847.) *J. Water Pollut. Control Fed.* **50**:2055-2057.

Suler, D.J. and M.S. Finstein. 1977. Effect of Temperature, Aeration, and Moisture on CO<sub>2</sub> Formation in Bench-Scale Continuously Thermophilic Composting of Solid Waste. *Appl. Environ. Microbiol.* **33**:345-350.

Finstein, M.S. and V.A. Matulewich. 1977. Nitrification Potential of River Environments. Final Report A-049-NJ. Water Resources Research Institute, Rutgers University, New Brunswick, New Jersey.

Strom, P.F. and M.S. Finstein. 1977. Nitrification in a Chlorinated Activated Sludge Culture. *J. Water Pollut. Control Fed.* **49**:584-592.

Strom, P.F., V.A. Matulewich and M.S. Finstein. 1976. Concentrations of Nitrifying Bacteria in Sewages, Effluents, and a Receiving Stream, and Resistance of these Organisms to Chlorination. *Appl. Environ. Microbiol.* **31**:731-737.

Matulewich, V.A., P.F. Strom and M.S. Finstein. 1975. Length of Incubation for Enumerating Nitrifying Bacteria Present in Various Environments. *Appl. Microbiol.* **29**:265-268.

Finstein, M.S. and M.L. Morris. 1975. Microbiology of Solid Waste Composting, p. 113-151. In, *Advances in Applied Microbiology*. Volume **19** (editor, D. Perlman), Academic Press.

Berkowitz, J., D.J. Kraft and M.S. Finstein. 1974. Persistence of *Salmonella* in Poultry Excreta. *J. Environ. Quality* **3**:158-161.

Arent, D.V. and M.S. Finstein. 1974. Composting Leaves by New Jersey Municipalities: Survey and Assessment. *Compost Sci.* **15**(5):6-10.

Finstein, M.S. 1973. The Sanitary Microbiology Section of the Handbook of Microbiology, Volume I, Organismic Microbiology (editors, Laskin and Lechevalier). CRC Press, Cleveland, Ohio.

Finstein, M.S. and M.R. Bitzky. 1972. Relationships of Autotrophic Ammonium-Oxidizing Bacteria to Marine Salts. *Water Research* **6**:31-40.

Finstein, M.S. 1972. Pollution Microbiology: A Laboratory Manual. Marcel Dekker, Inc., New York, New York.

Kraft, D.J., C. Olechowski-Gerhardt, J. Berkowitz and M.S. Finstein. 1969. *Salmonella* in Wastes Produced at Commercial Poultry Farms. *Appl. Microbiol.* **18**:703-707.

Dias, F.F., N.C. Dondero and M.S. Finstein. 1968. Attached Growth of *Sphaerotilus* and Mixed Populations in a Continuous-Flow Apparatus. *Appl. Microbiol.* **16**:1191-1196.

Finstein, M.S. 1968. Enumeration of Autotrophic Ammonium-Oxidizing Bacteria in Marine Waters by a Direct Method. *Appl. Microbiol.* **16**:1646-1649.

Finstein, M.S. 1967. Nitrogen and Phosphorous Removal from Combined Sewage Components by Microbial Activity. *Appl. Microbiol.* **14**:679-684.

Finstein, M.S. and H. Heukelekian. 1967. Gross Dimensions of Activated Sludge Floccs with Reference to Bulking. *J. Water Pollut. Control Fed.* **39**:33-40.

Finstein, M.S. and J.V. Hunter. 1967. Hydrolysis of Condensed Phosphates During Aerobic Biological Treatment. *Water Research* **1**:247-254.

Finstein, M.S. 1967. Growth and Flocculation in a Zoogloea Culture. *Appl. Microbiol.* **15**:962-963.

Finstein, M.S. and C.C. Delwiche, 1965. Molybdenum as a Micronutrient for *Nitrobacter*. *J. Bacteriol.* **89**:123-128.

Delwiche, C.C. and M.S. Finstein. 1965. Carbon and Energy Sources for the Nitrifying Autotroph *Nitrobacter*. *J. Bacteriol.* **90**:102-107.

Finstein, M.S. and H. Heukelekian. 1965. Filamentous Microorganisms and the Bulking of Activated Sludge. *Proc. 20th Purdue Industrial Waste Conf.* p.175-181.

Finstein, M.S. and M. Alexander. 1962. Competition for Carbon and Nitrogen between *Fusarium* and bacteria. *Soil Science* **94**:334-339.